DEPARTMENT OF MECHANICAL ENGINEERING

M.Tech-Product Design and Manufacturing

Course Outcomes-2020 Scheme

S.No.	Subject Code	Course Code	Course Outcomes
1	20MPD11 Mathematical Methods in Engg.	C101.1	Acquire the idea of significant figures, types of errors during numerical computation
		C101.2	Understand statistical and probabilistic concepts required to test the hypothesis and designing the experiments using RBD.
		C101.3	Learn various numerical methods to solve system of linear equations
		C101.4	Understand the roots of algebraic/transcendental equations and solve PDE‟s numerically
		C101.5	Analyze and solve PDE‟s related to wave equation arising in vibration analysis.

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2	20MPD12 Product Design and Development	C102.1	Identify and analyse the product design and development processes in manufacturing industry.
		C102.2	Define the components and their functions of product design and development processes and their relationships from concept to customer over whole product life cycle
		C102.3	Analyse, evaluate and apply the methodologies for product design, development and management
		C102.4	Undertake a methodical approach to the management of product development to satisfy customer needs
		C102.5	Carry out cost and benefit analysis through various cost models

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3	20MPD13 Finite Element Analysis	C103.1	Solve differential equations using weighted residual methods
		C103.2	Develop the finite element equations to model engineering problems governed by second order differential equations
		C103.3	Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements
		C103.4	Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements
		C103.5	Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system

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4	20MPD14 Product life cycle Management	C104.1	Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation.
		C104.2	Illustrate various approaches and techniques for designing and developing products.
		C104.3	Apply product engineering guidelines / thumb rules in designing products for molding, machining, sheet metal working etc.
		C104.4	Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plan
		C104.5	Understand the Tolerance mass property calculations

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5	20MPD15 Advanced Materials & Processing	C105.1	an understanding of the principles, capabilities, limitations and applications of commonly used advanced materials processing technologies
		C105.2	an in-depth knowledge of precision materials removal and laser processing technologies
		C105.3	Understand the non ferrous alloys and its applications
		C105.4	Understand the properties of Polymers and Ceramics
		C105.5	Understand the processing of composites and polymers.

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6	20MPDL16 Basic Product Design Laboratory-I	C106.1	Demonstrate the critical theories of design, systems thinking, and design methodologies
		C106.2	Produce great designs, be a more effective engineer, and communicate with high emotional and intellectual impact
		C106.3	Understand the diverse methods employed in design thinking and establish a workable design thinking framework to use in their practices
		C106.4	Conceive, organize, lead and implement projects in interdisciplinary domain and address social concerns with innovative approaches

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7	20RMI17 Research Methodology and IPR	C107.1	Discuss research methodology and the technique of defining a research problem
		C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.
		C107.3	Explain various research designs and their characteristics.
		C107.4	Explain the art of interpretation and the art of writing research reports

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8	20MPD21 Industrial Design & Ergonomics	C108.1	Understanding the concepts of Industrial design and man-machine relationship.
		C108.2	Design of optimistic display and control devices for various applications.
		C108.3	Applying the anthropomorphic data in ergonomic design
		C108.4	Understanding the visual effects of lines, form and colour on engineering equipments
		C108.5	Choosing appropriate aesthetic aspects for design of industrial machinery and devices.

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9	20MPD22 Design for	C109.1	Understand the principles of manufacturability and design for manufacture.

	Manufacturing	C109.2	Design casting and weldment for economic production quantity.
		C109.3	Understand the concept of assembly, its design and true position of datum system.
		C109.4	Design parts cut to length and screw machine parts of various processes, open and closed die forging
		C109.5	Design guidelines and background for powder metallurgy parts and reviewing of formed parts.

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10	20MPD23 Product Planning & Marketing	C110.1	Understand the Product strategy and planning product and new product strategy.
		C110.2	Analyse the concept of Proactive new product development process
		C110.3	Understand the concept of Market definition and entry strategy, desirable characteristics of markets, market profile analysis.
		C110.4	Understand the concept of Product positioning
		C110.5	Analyse the concept of Launching the products and Strategy for Testing new products – Planning and tracking launch of durable and industrial products.

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11	20MPD243 Non Traditional Machining Process	C111.1	Compare conventional and non-conventional manufacturing process and understand the mechanism of USM and AJM
		C111.2	Understand EDM concept and operating characteristic
		C111.3	Distinguish ECM with other operations and various application and understand the usage of various chemical and maskants in CHM.
		C111.4	Understand the generation of plasma, electron beam, laser and their machining characteristics
		C111.5	Understand the formation of ion beam and this application and various high velocity forming process

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12	20MPD253 Lean Manufacturing System	C112.1	To understand issues & challenges in implementing & developing lean manufacturing techniques from TPS & its contribution for improving organizational performance.

		C112.2	Apply lean techniques to bring competitive business culture for improving organization performance
		C112.3	Analyze how lean techniques can be applied to manufacturing & service industry
		C112.4	Developing lean management strategy for Supply chain management
		C112.5	Analyzing how lean technique can create value generation for organization

S.No.	Subject Code	Course Code	Course Outcomes
13	20MPDL26 Product Design Laboratory - II	C113.1	Demonstrate the critical theories of design, systems thinking, and design methodologies
		C113.2	Produce great designs, be a more effective engineer, and communicate with high emotional and intellectual impact
		C113.3	Understand the diverse methods employed in design thinking and establish a workable design thinking framework to use in their practices
		C113.4	Conceive, organize, lead and implement projects in interdisciplinary domain and address social concerns with innovative approaches

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14	20MPD27 Technical Seminar	C114.1	Attain, use and develop knowledge in the field of engineering and other disciplines through independent learning and collaborative study.
		C114.2	Identify, understand and discuss current, real-time issues.
		C114.3	Improve oral and written communication skills.
		C114.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
		C114.5	Apply principles of ethics and respect in interaction with others.
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15	20MPD31 Product Analysis and cost optimization	C201.1	Analyse the Selection of optimum process, standardization. Break even analysis- application and area of use -problems -multi - product analysis.
		C201.2	Understand the Steps in selection, analysis and implementation, Cost estimation.

		C201.3	Understand the different types of cost.
		C201.4	Understand the different types Variance Analysis
		C201.5	Analyse the various Cost Optimization Techniques

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16	20MPD322 Rapid Prototyping	C202.1	Describe product development, conceptual design and classify rapid prototyping systems; explain stereo lithography process and applications.
		C202.2	Explain direct metal laser sintering, LOM and fusion deposition modelling processes.
		C202.3	Demonstrate solid ground curing principle and process
		C202.4	Discuss LENS, BPM processes; point out the application of RP system in medical field define virtual prototyping and identify simulation components.
		C202.5	Understand the RP Process Optimizations

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17	20MPD332 Simulation and Modelling	C203.1	Describe the role of important elements of discrete event simulation and modelling paradigm.
		C203.2	Conceptualize real world situations related to systems development decisions, originating from source requirements and goals.
		C203.3	Develop skills to apply simulation software to construct and execute goal-driven system models
		C203.4	Interpret the model and apply the results to resolve critical issues in a real world environment.
		C203.5	Understand the Input modeling, verification and validation of simulation models.

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18	20MPD34 Project Work phase -1	C204.1	Comprehend a complex engineering problem while considering technical, ethical, and social issues.
		C204.2	Identify the limitations of existing solutions with the focus on design techniques and environmental factors.
		C204.3	Implement the technical solution by adopting

			modern tools and techniques, while analyzing the technical feasibility and cost effectiveness.
		C204.4	Ability to work and communicate effectively as an individual and in a team in designing, developing, testing and documenting the solution.
		C204.5	Validate the system in terms of applications in user's environment while improving personal

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19	20MPD35 Mini-Project	C205.1	Apply the methodology which brings out the project with well-defined conclusions.
		C205.2	Build and present a clear and coherent presentation of the work to a arrange of technical and non-technical audience
		C205.3	Develop a project report that has a clear, coherent argument, logical structure, correct grammar and project reference
		C205.4	Develop knowledge in publishing the research work and communicate the ideas with the world
		C205.5	Apply the methodology which brings out the project with well-defined conclusions

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20	20MPDI36 Internship	C206.1	Identifying the Industries/organizations that give training in interested field of Industrial and Production engineering
		C206.2	Developing the knowledge in cutting-edge technologies by undergoing the Training in the industries/organizations
		C206.3	Demonstrating the leadership qualities in problem solving of the field using the gained knowledge
		C206.4	Preparing to work in group while undergoing internship
		C206.5	Writing and presenting the report of internship

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21	20MPD41 Project work phase	C205.1	Present the project and be able to defend it.
		C205.2	Make links across different areas of knowledge

	-2		and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
		C205.3	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
		C205.4	Demonstrating the practice of Life-long learning to upgrade to the future technology
		C205.5	Learn on their own, reflect on their learning and take appropriate actions to improve it.